

REMARKS

The specification has been amended to correct a grammatical error and does not present new matter. No amendments, cancellations, or additions have been made to the claims. As such, claims 6-30 are currently pending in the case. Further examination and reconsideration of the presently claimed application are respectfully requested.

Allowed Claims

Claims 6-11 and 26-30 were allowed. Applicant appreciates the Examiner's allowance of claims 6-11 and 26-30 and awaits allowance of the remaining claims.

Objections to the Claims

Claims 14, 15, 17, 18, 20, 21, 24, and 25 were objected to as being dependent upon rejected base claims. Applicant sincerely appreciates the Examiner's recognition of the patentable subject matter recited in these claims. However, as will be set forth below, independent claims 12 and 19, as well as claims dependent therefrom, are patentably distinct from the cited art. Accordingly, removal of this objection is respectfully requested.

Section 103 Rejections

Claims 12, 13, 16, 19, 22, and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,380,056 to Shue et al. (hereinafter referred to as "Shue") in view of U.S. Patent No. 5,304,398 to Krusell et al. (hereinafter referred to as "Krusell") and U.S. Patent No. 4,749,640 to Tremont et al. (hereinafter referred to as "Tremont") and U.S. Patent No. 6,451,660 to Ma et al. (hereinafter referred to as "Ma"). To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond*, 910 F. 2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). The cited art does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

None of the cited art teaches or suggests growing an oxide film in the presence of an ozonated substance and depositing a silicon nitride film upon and in contact with the oxide film. Claim 12 recites: "[a] method for processing a semiconductor topography, comprising: growing an oxide film upon the semiconductor topography in the presence of an ozonated substance and depositing a silicon nitride film upon and in contact with the oxide film." As noted in the Office Action, although Shue discloses a topography in which silicon nitride is arranged above an oxide film, Shue fails to teach or suggest a method of forming such a topography by growing an oxide film in the presence of an ozonated substance and depositing silicon nitride thereon. On the contrary, Shue teaches forming silicon nitride layer 14 upon silicon layer 12 and then thermally oxidizing the silicon nitride layer and underlying silicon layer to form thermally oxidized silicon nitride containing layer 18. Consequently, Shue fails to teach or suggest the limitations of claim 12.

As noted in a response to a previous Office Action mailed June 18, 2003, the deficiencies within Shue cannot be overcome by the teachings of Krusell or Tremont. In particular, Krusell fails to teach or suggest growing a silicon dioxide film in the presence of an ozonated substance. Rather, Krusell specifically teaches depositing a silicon dioxide layer using chemical vapor deposition techniques. As such, although Krusell teaches using an ozonated substance as a source of oxygen to form an oxide layer, modifying Shue to use such a method would not produce the limitations of the presently claimed case. In addition, there is no motivation of combine the teachings of Shue and Krusell since Shue specifically teaches forming a layer including nitride. Krusell, on the other hand, teaches forming a silicon oxide layer which is absent of nitrogen. "It is believed that the high concentration of silicon dioxide in the resultant films, and the relative absence therein of nitrogen-containing compounds such as silicon nitride or silicon oxynitride, is due to the strength of the silicon-oxygen bond relative to the Si-N bond." (Krusell, column 2, lines 46-51).

Although Tremont does teach growing oxide 64 and depositing silicon nitride 66 thereon, oxide 64 is not grown in the presence of an ozonated substance as recited in claim 12. Consequently, Tremont does not teach the limitations of the presently claimed case. Tremont does teach rinsing the topography described therein in the presence of an ozonated substance, but such a process only provides, if at all, a thin oxide layer of a few monolayers. Such an oxide film thickness is not sufficient to serve as oxide 64, which Tremont teaches having a thickness between 100 angstroms and 400 angstroms. In particular, it is presumed that the thin layer of oxide grown in the presence of an ozonated substance as taught in Tremont is not sufficient to prevent etching of silicon wafer 60 when portions of silicon nitride 66 are etched from the topography as described in reference to Fig. 2F. Consequently, there is no motivation within Tremont to deposit a silicon

nitride layer upon an oxide layer grown within the presence of an ozone substance. Accordingly, Tremont cannot be combined with Shue or Krusell to teach the limitations of claim 12.

The aforementioned deficiencies within Shue, Krusell and Tremont to teach the limitations of claim 12 cannot be overcome by the teachings of Ma. Ma describes a method for forming an oxide layer, particularly for supporting a polycrystalline structure of a bipolar device. As noted in column 1, lines 62-64 of Ma, "[t]he oxide layer between the silicon substrate and the polycrystalline layer is preferably relatively thin and uniform, generally less than 20 Å in thickness." In alignment with such an objective, Ma teaches a method of growing an oxide layer in ozonated water to produce an oxide layer thickness less than 20 angstroms. However, Ma fails to teach depositing a silicon nitride layer upon such a layer and, therefore, fails to teach the limitations of claim 12. In addition, Ma cannot be combined with Shue or Krusell to teach the limitations of claim 12 since neither Shue nor Krusell teaches depositing a nitride layer upon an oxide layer. Although Tremont teaches the deposition of a silicon nitride on an oxide layer, there is no motivation to combine the teachings of Tremont and Ma to teach the limitations of claim 12. As noted above, the oxide thickness obtained using the method described in Ma is less than 20 angstroms. Without any teaching or suggestion that thicker oxide films can be fabricated from such a method, one skilled in the art would not be motivated to use such a method for applications in which a relatively thick oxide film is needed, such as taught in Tremont with oxide 64 having a thickness between 100 angstroms and 400 angstroms. Consequently, Ma fails to provide motivation to modify the teachings of Tremont to teach the limitations of claim 12.

None of the cited art teaches or suggests transferring a semiconductor topography at a temperature which is substantially similar to a temperature at which an oxide film is grown upon the topography. Claim 19 recites in part: "[a] method for forming an oxide-nitride stack, comprising: growing an oxide film in a first chamber at a first temperature; transferring the semiconductor topography from said first chamber to a second chamber, wherein said transferring comprises exposing the semiconductor topography to a substantially similar temperature as said first temperature ..." As noted in a response to a previous Office Action mailed June 18, 2003, Shue, Krusell and Tremont do not appear to mention transferring a topography between chambers for processing. In particular, Shue and Tremont make no mention as to whether the process steps described therein are performed in a single chamber or multiple chambers. Although Krusell discloses atmospheric pressure reactor 250 in Fig. 2 as having multiple process chambers (i.e., reaction chambers 292, 294 and 296), Krusell fails to teach using the process chambers for sequential processing of a wafer. On the contrary, it appears that reaction chambers 292, 294, and 296 are all used to deposit silicon dioxide in the same manner such that multiple wafers may be processed

simultaneously. In particular, Krusell specifically teaches the interiors of "... second and third reaction chambers 294 and 296 are substantially identical [to first reaction chamber 292]." (Krusell, column 4, lines 1-2). Without any teaching or suggestion of transferring a topography between processes, much less transferring a topography at a temperature which is similar to a process temperature used to grow an oxide film upon the topography, there is no motivation within Shue, Krusell or Tremont to teach the limitations of claim 19.

Although Ma teaches forming an oxide layer in a tank of ozonated water and subsequently forming a polysilicon layer thereon in a furnace. There is no teaching or suggestion within Ma of transferring the topography at a substantially similar temperature as the temperature at which the oxide layer was formed. As such, Ma fails to teach the limitations of claim 19. Since none of the cited art teaches the limitations of claim 19, no combination of the cited art can teach the limitations of claim 19. Consequently, claim 19 is patentably distinct over the cited art.

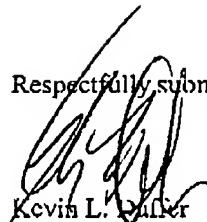
For at least the reasons stated above, none of the cited, taken alone or in combination, teaches or suggests the limitations of claims 12 or 19. Therefore, claims 12 and 19, as well as claims dependent therefrom, are asserted to be patentably distinct over the cited art. Accordingly, removal of this rejection is respectfully requested.

CONCLUSION

This response constitutes a complete response to all issues raised in the Office Action mailed December 22, 2003. In view of the remarks traversing the rejections, Applicants assert that pending claims 6-30 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned attorney earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Conley Rose, P.C. Deposit Account No. 03-2789/5298-08000.

Respectfully submitted,



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